ASSESSMENT OF TEACHERS' PEDAGOGICAL COMPETENCIES IN SECONDARY SCHOOLS AND DEVELOPING A PEDAGOGICAL MODEL

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CERTIFICATE

This is to certify that the synopsis entitled "Assessment of Teachers' Pedagogical Competencies in Secondary Schools and developing a Pedagogical Model" submitted in partial fulfilment of the requirements for the degree of Doctor of Philosophy in the Department of Education, School of Education, Lingaya's Vidyapeeth, Faridabad, is a record of bonafide research carried out by Ms. P. Lavanya, Reg. No. 19 PHED 03 (W) under my supervision and no part of this synopsis has been submitted for any other degree. The assistance and help received during the course of this investigation have been acknowledged.

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ASSESSMENT OF TEACHERS' PEDAGOGICAL COMPETENCIES IN SECONDARY SCHOOLS AND DEVELOPING A PEDAGOGICAL MODEL

"Teaching is not the mere imparting of knowledge but the cultivation of an inquiring mind"

— Jiddu Krishnamurthy

1.0 Introduction

Quality education is one of the key components towards the national development of a country that influences national thinking and character building. The term 'education' is used in different contexts. In its narrow meaning, formal schooling is where cultural heritage, knowledge, values, and skills are passed on to generations. In the broader concept, education is a lifelong process. In other words, any act/experience having a positive and worthwhile effect on the mind, character, and ability of an individual during his lifetime is called 'education.' Pedagogy is the art of teaching that brings effectiveness in teaching-learning. Effective pedagogical practice promotes the achievement of students and builds up the confidence of the teachers in teaching. It contributes to bringing quality of learning and teaching in the classrooms. The education commissions and committees formed at different times stressed the need for developing pedagogical competencies of teachers to ensure the quality of education, which has been a major educational focus since the commencement of their reports. However, quality obviously remained an anticipated vision so far. The various studies had also revealed that classroom teaching-learning was mostly teacher-dominated, there was more emphasis on rote learning, and repetition of the textual materials was common practice in the classroom teaching-learning. The major cause for the gap in pedagogical practices is due to lack of pedagogical competencies in school teachers. The pedagogical dimensions identified in the study will provide an insight to the teachers and administrators to study the elements and strategies and could reflect on their current teaching practices to bring an appropriate positive change in the classroom instruction. (PAG, 2014). Hence, it is needed to assess the necessary pedagogical competencies of secondary school teachers to bring the effectiveness in teaching so that quality in education is enhanced. The conceptual and theoretical framework of the study is given to understand the variables

involved in the study. Objectives, research questions are framed on the basis of research gaps identified, a well-designed methodology is written to carry out the research.

2.0 Conceptual framework

This section explores the following concepts: ancient and modern school education and pedagogy, various dimensions of pedagogy, the pedagogical challenges faced by teachers, students, and administrators, different pedagogical models, the development of pedagogical competencies, and the necessity of assessing these competencies. The goal is to ensure that 21st-century teachers can effectively facilitate the interconnected teaching-learning process.

2.1 Ancient Education System and Pedagogy

The ancient Indian education system, dating back to the Rigveda, focused on holistic development and self-realization, emphasizing moral, physical, spiritual, and intellectual growth. Key principles included humility, truthfulness, discipline, self-reliance, and respect for all creation. Education highlighted the harmony between humans and nature, following the teachings of the vedas and upanishads, and emphasized duties towards self, family, and society.

Learning was both formal and informal, occurring in homes, temples, pathshalas, tols, chatuspadis, and gurukuls. Gurukuls, located in serene forest environments, facilitated a deep bond between guru and shishya, fostering comprehensive learning and disciplined living. Assessment included shastrartha (scriptural debates) and peer learning.

Women had access to education, with notable scholars such as Maitreyi and Gargi. Education spanned various disciplines, from history and law to medicine and debate. Prominent centers like Takshashila and Nalanda attracted students globally, offering studies in scriptures, law, medicine, astronomy, and the arts.

Teachers enjoyed complete autonomy in student selection and curriculum design, with a focus on debates and discussions. Education was free, with support through donations, and aimed at holistic development, laying the groundwork for a free and decentralized education system in ancient India.

2.2 Educational Perspectives in the 21st Century- Education in the 21st century in the Indian context hastens for the creation of knowledge for sustainable development. In the global ranking of Times Higher Education 2020, no Indian universities appeared in the top 300 and there were only six Indian Universities listed in the top 1000. UNESCO believes that a person's education

is to be arranged as per the four fundamentals of learning—learning to know, learning to do, learning to live together, learning to be. These four pillars form the basis to improve quality education, bringing out the holistic development (i.e.) from cognitive to ethical, from aesthetically to technical, from immediate to transcendent. The secondary stage of education is crucial for shaping the future members of society (Times Higher Education, 2020). To provide quality education, current educational practices must evolve to meet individual goals within a socioeconomic context, and India must participate in the global pursuit of educational excellence. For a developing nation like India, ensuring quality education at this level is paramount. Therefore, the teaching approach at the secondary stage should shift from being primarily exam-oriented to fostering quality learning.

2.3 The Vision of National Education Policy 2020 -India's education system is rooted in the spirit of Indian Heritage and Culture and NEP 2020 aims at modifying Indian ethics into vigorous wisdom of global force, 'Bharat'. This policy foresees that the present-day scheme of study not only provides first-class education to each child but also inspires for social responsibility and civic sense about our Fundamental Duties and Constitutional Values in being the Pride of India, reflecting a voracious global native with deep spirit and commitment to individual privileges, feasible growth, and livelihood. NEP 2020 revamps the existing 10+2 pattern of School Education into 5+3+3+4 covering the ages from 3-18, calling for a robust foundation of Early Childhood Care and Education (ECCE) from age 3 onwards. Now the child spends 5 years in Foundational Stage, (aged 3-6 in preschool & aged 6-8 in class 1 & 2); 3 years in Preparatory Stage, (aged 8-11 in class 3, 4 & 5) ; 3 years in Middle Stage, (aged 11-14 in class 6, 7 & 8) and 4 years in Secondary Stage, (aged 14-18 in class 9, 10, 11 & 12).

NEP 2020 replaces the 34-year-old NPE, 1986, very much suited to the 21st-century skills and needs, aiming at drawing the distinctive ability out from every child. In 2015, India endorsed global education development through Sustainable Development Goal 4 (SDG4). This agenda pursues to "ensure inclusive and equitable quality education and promote lifelong opportunities for all" by the year 2030. To achieve this goal, the whole Education system is to be modified, revamped, and revised to promote learning. Globally India's youth population will be at altitude in the decade to come. Education is a fundamental right, and universal access to quality education is crucial for promoting national development and economic progress globally. NEP 2020 proposes a learner-centered pedagogy that facilitates learning with less content and a curriculum more oriented to think critically and solve problems. With this aim, NEP 2020 is put forward to bridge the gap between the existing condition of learning outcomes and 21st-century skills required from Early Childhood Care and Education to Higher Education through

Secondary Education. This policy creates a new system of regulation and governance for 21st-century educational aspirations and goals, preserving Indian heritage and culture, and built on a code of ethical values for national integrity. The policy emphasizes knowledge creation for individual employment, laying the foundation for the development of high-order cognitive skills. The core principles of NEP 2020 will guide India's education system, fostering a conducive learning environment with diverse learning experiences and robust physical infrastructure, equipped with appropriate resources, accessible to all students.

3.0 Concept of Pedagogy and its Definitions

The term 'Pedagogy' refers to the study of teaching methods, practices, and approaches, how a teacher teaches, in theory, and practices, and its effect on learners. A carefully reviewed pedagogy encompasses teaching styles, teaching theory, feedback, and assessment, all of which enhance student learning and foster higher-order thinking skills (Tes Editorial, 2019). The pedagogy of teaching refers to the way a teacher delivers the content of the curriculum to the class. When planning a lesson, a teacher considers various ways to deliver the content, based on their teaching preferences, experience, and the teaching context. The age of the students and the nature of the content significantly influence the pedagogical practices chosen. A teacher uses research along with one's own teaching experience to teach the different age groups in different academic disciplines. These justifications behind one's decision will become the base of the teacher that develops into his or her own pedagogical principles over the years (Tes Editorial, 2018).

According to Merriam-Webster, pedagogy is the "art, science, or profession of teaching; especially: education." This definition covers up a lot of features in teaching, with pedagogy as to studying teaching methods. Each teacher has a different pedagogical approach to learning in her classroom. She must reflect upon the most effective means of content delivery based on student needs. The principles and practices of teaching are both an art and a science and are continually evolving. Collaborative learning, flipped learning, and deep learning are now central to the modern classroom, providing diverse approaches to building a conducive learning environment. as illustrated in fig-1 (Sean McPheat, 2017)

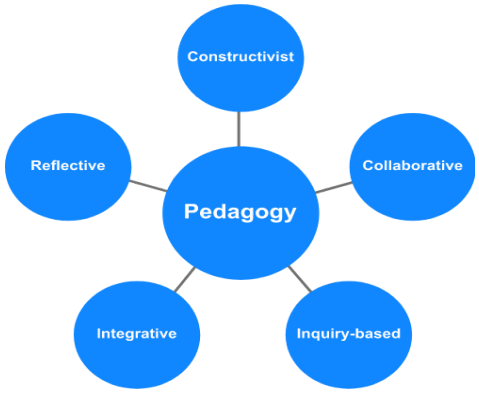
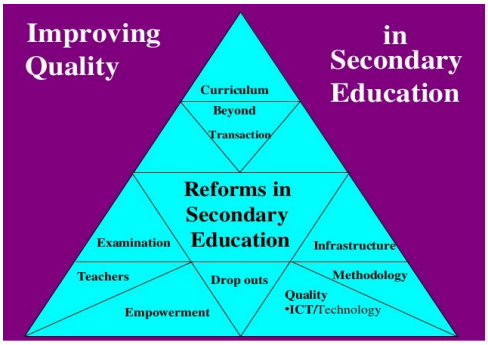


fig-1: Pedagogical Approaches

3.1 Understanding Pedagogy in Secondary School Education - India

Our Indian education system at the secondary stage occupies the most crucial position, as it connects the middle stage to higher education, where the students come of age to become complete members of this complex society. Secondary Education witnessed exceptional changes after independence. The Government of India appointed different committees and commissions to review and recommend suggestions for improving secondary education. The university education commission 1948-49 under the chairmanship of Dr. S. Radhakrishnan, observed that "our secondary education remains the weakest link in our educational machinery and needs urgent reform." The secondary education commission report 1952-53 was recommended by The central advisory board of education under the chairmanship of Dr. A. Lakshmanswami Mudaliar, then Vice-Chancellor of Madras University to survey the problems of secondary education, which is the landmark in the reconstruction of India's secondary education. The commission proposed improving teaching skills, methodology, and evaluation of student learning for quality education.



Quality is the keyword without which there is no existence in the present-day globe due to globalization, industrialization, and liberalization. The most recent curriculum becomes out of date in a year or two in the fast-paced society. Teaching is the noblest of all professions and teachers are the main source of knowledge and value for children. The academic performance of a student depends most of all on the quality of the teacher. Pedagogical Competencies prepare and entitle the teacher to meet up the requirements of the profession and face the challenges therein. D. R. Gibson, Cambridge Institute of Education attempted empirically in his paper 'The role of the Primary and Secondary School Teacher' to answer that professional training and orientation are important to improve pedagogical competencies which have a direct impact on the student academic performance.

Understanding the meaning of quality education has different perspectives concerning school management, school teachers, and parents. In this evolving landscape, the role of a teacher in the blended teaching-learning process has shifted from being an information provider to a learning facilitator. Teachers are a persistent and key element in the teaching process. Technology has transformed the teaching-learning process and teachers need to keep themselves updated on their knowledge and skills. Rakesh Manna and Jayanta Mete (2016) studied 'Secondary Teacher Education System in India with special reference to West Bengal' and 'Implementing E-Learning in Quality Teacher Education Programme in India'. The article indicates that teachers who are not up-to-date with advanced teaching skills and competencies will struggle to meet the growing needs of today's classroom, which is essential in the current educational environment.

4.0 Pedagogical Problems in Secondary Schools

Education shapes young minds, fostering critical thinking and different perspectives. It has a lasting impact, as children learn language, science, and mathematical skills in school that benefit them throughout their lives. Teaching encourages learning through discovery and knowledge

acquisition, while pedagogy refers to the methods and principles of teaching, both in practice and as a theoretical concept. Teachers are the main determinants of quality for any educational system. Their devotion, effectiveness and efficiency form the basis for the success and future of any educational organisation. A pedagogue is a teacher and pedagogy are the science of teaching. Thus, pedagogical problems can be interpreted as problems related to teachers and teaching. (Ukeje, B., 1975). Various studies revealed pedagogical problems at the school level.

The problems related to the pedagogy of teachers are categorized into following three groups:

4.1 **Problems related to students:** Students of public schools lack interest, motivation, and positive feelings towards study, which makes them difficult in classroom teaching. The number of students is excessive in each class and creates much noise and disturbance to the whole class. Examination patterns have emphasized rote learning more than practical learning. Much of the curriculum content is theoretical and not practical for future use. Most of the students are irregular in public schools. Language difficulty with the students is found in most public schools. Students of low achievement levels usually join the public schools that have created problems in quality teaching and learning.

4.2 **Problems related to school teachers:** Nowadays, the biggest challenge for teachers is to ensure their class is interesting and appealing for students. For this, they are continuously innovating their teaching techniques for a better understanding to boost high academic performance of their students. With time being changed, secondary school teachers implement new techniques and methods to train their students in theoretical study with practical exposure. The teaching methods adopted sharpen the students in various academic skills and help coordinate across different subjects which ultimately enhance student academic performance. Pooja Kamboj and Sushil Kumar Singh (2015) studied 'Effectiveness of Selected Teaching Strategies in Relation to the Learning Styles of Secondary School Students in India'. Secondary school students since being creative, imaginative, convergent/divergent thinkers having problem-solving skills, learn as they explore. Innovative teaching methodologies outperform traditional classroom teaching.

Most of the lower secondary school teachers have to take classes the whole day. They have no

sufficient time for evaluating the answer scripts of the students and preparing for effective teaching. Overcrowded classes hinder the quality of the teaching-learning process. The curriculum is changing. Teachers lack the knowledge of new curriculum and new topics included in various subjects. Teachers have to teach various subjects in a day that makes it difficult for them to prepare. Teachers also lack the skill of using various instructional techniques appropriate to the topic and objectives. Students of the class differ significantly in their educational level. Hence, it is quite difficult for teachers in dealing with a heterogeneous group. Teachers lack commitment towards their profession due to various reasons.

4.3 **Problems related to school administration:** Most teachers reported that public schools lack sufficient funds for instructional materials, lab materials, and other facilities. Classrooms often have inadequate and insufficient furniture, and there are not enough instructional materials to meet curriculum objectives. There is also a shortage of subject teachers and appropriate classrooms, with many classrooms being too small for the number of enrolled students. Additionally, textbooks, teacher guides, and other educational materials are often unavailable in adequate quantities at the start of the session.

5.0 Pedagogical Competencies and its Dimensions

Competencies have been defined as "a measurable pattern of knowledge, skill, abilities, behaviors, and other characteristics that an individual needs to perform work roles or occupational functions successfully" (Rodriguez et al., 2002, p. 310) Competencies are often combinations of the knowledge, skills, and abilities necessary to perform a given role (Campion et al., 2011)

Richard (2015) asserted that excellent pedagogic competency is an aspect of teachers' knowledge and skills. It includes teachers' awareness, classroom management, interaction, teaching skills, and using the appropriate approaches, methodologies, techniques, and strategies.

Pedagogical competence, based on broad and current subject knowledge, as well as understanding student learning and subject-based teaching issues, is crucial for effective interaction on teaching and learning. This competence strengthens the student-teacher relationship and enhances academic performance. It is a key factor in the quality of education,

requiring a reflective and critical approach to teaching, learning, and pedagogical development over time.

The pedagogical dimensions do not represent a single formula that teachers need to follow. Understanding the importance of the interconnectedness of the various dimensions will assist teachers to bring quality teaching into their classroom settings. Thus, teachers have to be skillful in using the strategies (PAG, 2014). Assessing pedagogical competence involves evaluating the quality of teaching, which includes one's professional role, research-based teaching, and personal research as key components.

5.1 The Swedish Perspective of Pedagogical Competence

Uppsala University's Division for Development of Teaching and Learning has developed the Swedish perspective on pedagogical competence, formulating assessment criteria based on specific performance indicators. Fulfilling these performance indicators demonstrate that each criterion is achieved. One individual may or may not possess all of the performance indicators. The criteria for assessing pedagogical competencies are as follows:

Facilitator for Student Learning: The teacher creates a good teaching climate and simulates the students to be active learners. The teacher has a clear conception of the roles and responsibilities of the student and the teacher and helps students to develop good study habits.

Scientific Approach towards Teaching: The teacher plans well in accordance to support student learning and helps students to develop a reflective attitude and critical thinking, thus linking teaching to present research findings within the subject area.

Broad Subject Knowledge: The teacher is competent within the subject area by continuously updating knowledge, seeking information through subject related research via journals or by attending conferences.

Awareness of Student Learning Methods: The teacher deeply understands how students learn, is knowledgeable about various learning styles, and remains updated on didactic knowledge pertinent to student learning in their subject area.

Teachers' Pedagogic Knowledge: The teacher is adaptable in using various teaching methods and techniques and is knowledgeable about different assessment methods. The teacher strives continuously in developing knowledge by attending pedagogical conferences.

Understanding Educational Goals: The teacher is aware of goals and regulations to conduct teaching within a stipulated framework and possesses good curricular knowledge, using content and resources as per the situation at hand to acquaint with demands in vocational education.

Teacher's Holistic View: The teacher coordinates and explains to the students how the course at hand relates to their education as a whole and adapts teaching to the existing framework .

Application of teaching Skills: The teacher applies different teaching strategies to cater as per the students' needs, gives an overview of the course content and provides clear information in good time with prompt feedback, thereby exhibiting good soft skills for improved student learning and student performance.

Striving for continuous improvement: The teacher develops study guides and teaching material, creates an exposure for his/her teaching with others. The teacher engages in educational activity and development by participating in training courses and keeps informed about his/her teaching experiences in educational journals, at conferences and so on.

Leadership Skills: The teacher presents good leadership skills and carries out adherent duties with positive results. The teacher believes in promoting everyone's cooperation and participation, striving for clear information with effective communication. The teacher is an appreciated leader stimulating pedagogical activities and discussions.

5.2 Pedagogical competencies derived from Mihaela's study

Mihaela (2015) analyzed the structure of different competencies of school teachers by taking professional competence and scientific variables provided for a set of capabilities, necessary scientific knowledge of specific curriculum content, and pedagogical competence circumscribing the ability to. The results underlined the fact that the psycho-pedagogical dimension is primordial in the structure of preschool and primary school teachers' didactic competence. The psycho-pedagogical dimension targets the identification of the pupils' age and individual characteristics and the capacity to adapt the learning contents. The study finds that competencies in the scientific content of disciplines are less important and highlights significant differences between two categories of teaching staff. It emphasizes the need to move beyond unilateral opinions (pedagogic, psychological, or managerial) and adopt a systemic view of professional competencies, considering the structure and various factors that facilitate or hinder competence.

5.3 Pedagogical competencies derived from Ryegard's study

Ryegard and others (2010) identified major assessment areas for pedagogical competency as teaching skills, theoretical knowledge, and an approach characterized by a willingness and ability to develop. The 21st teacher is required to perform many tasks apart from the regular teaching role. For an effective teaching-learning process to be conducted in a smooth manner, the teacher should adopt certain pedagogical competencies. The pedagogical competencies can be measured using a set of criteria, based on given parameters/dimensions. The different pedagogical competencies which are necessary to ensure quality education in today's classroom for an improved teaching-learning process include as follows -

Digital Competence involves confidently and critically using Information Communication and Technology (ICT) based on basic computer skills to retrieve, assess, store, produce, present, and exchange information, and to communicate and participate in collaborative networks via the Internet (Punie & Cabrera, 2006). Other key competencies include Psychological, Managerial, Leadership, Teaching, Technological, Administrative, Sociocultural, Planning, Organizational, Assessment, and Interactional Competence.

5.4 Pedagogical Dimensions identified in Pedagogy and Assessment Guide, (PAG, 2014)

PAG provided teachers and administrators with a comprehensive insight into the pedagogical dimensions identified in the National Curriculum Framework (NCF) developed by the National Institute of Education, the Republic of Maldives in 2014, which are: creating a positive learning environment, connecting prior learning to new learning, making learning meaningful, fostering reflective practice, catering to individual difference. The PAG explores each pedagogical dimension in-depth and identifies various elements and implementation strategies crucial for teachers' understanding which they might be already doing in their classrooms. The PAG aims for teachers to reflect critically on their practices, evaluate students' learning based on evidence and change practices accordingly to bring appropriate positive change. (NCF, 2014)

6.0 Pedagogical competency models

Pedagogical competency relies on extensive, current subject knowledge, an understanding of student learning, and subject-specific teaching issues. It requires a reflective and critical approach to teaching and pedagogical development, linked to one's professional role. Research-based teaching and personal research are crucial for meeting the scientific requirements of Chalmers' programs.

The Lund model of pedagogical competence, developed at Lund University, Sweden, consists of a four-stage cycle: teaching practice, observation, theory, and planning. Demonstrating pedagogical competence involves progressing through this entire cycle, emphasizing that competence is an ongoing process rather than a fixed achievement. A pedagogically competent teacher evolves over time through this cyclical process.

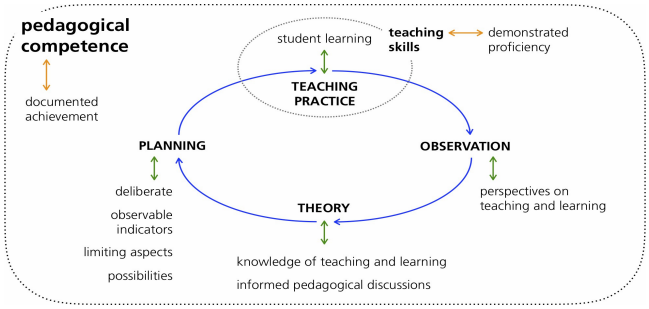


Fig-2

The figure highlights the complexity of pedagogical competence and the activities of a skilled teacher. It shows that pedagogical competence is demonstrated through effective teaching, teaching development, evaluations, and student learning. Both general and subject-specific knowledge about student learning is essential for ongoing development of pedagogical competence. The model, based on the Scholarship of Teaching and Learning (SoTL) and inspired by the Lunds Technical Faculty report, outlines these principles.

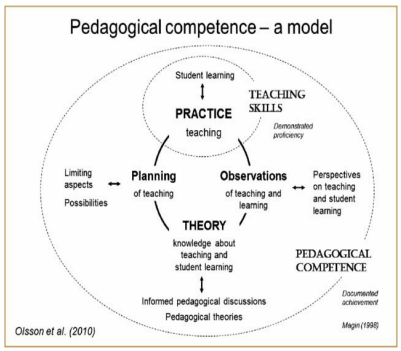


Figure-3: LTH Pedagogical Competence Model

7.0 Theories on Pedagogy

Pedagogy, the discipline focused on the theory and practice of education, encompasses the knowledge and skills of teaching. Theories in pedagogy propose how teaching should be conducted and how learning can be facilitated. Quality education, essential for achieving educational goals, relies on effective pedagogy. Teachers should apply pedagogical strategies derived from these theories. Dickson Kimeli Rutto (2018) studied pedagogical theories to provide teachers with relevant knowledge. These theories originate from various perspectives: Herbartianism, the New London Group, and learning theories.

Johann Friedrich Herbart (1776-1841), considered the father of pedagogy, identified five key components for effective teaching: Preparation, Presentation, Association, Generalization, and Application. Teachers should integrate these elements into their teaching practices.

The new London group (1996), refers to an international consortium of academics researching literacy pedagogies and identified four major components of pedagogy namely: Situated Practice, Overt Instruction, Critical Framing, and Transformed Practice.

Learning theories serve as a conceptual framework for teaching & learning from which stem pedagogical theories. The major learning theories are:

Behaviorist learning theory focuses on observable behaviors, disregarding mental activities. It involves analyzing tasks for learning objectives, designing teaching procedures and mastery tests for each sub-task, and reinforcing behaviors that lead to task achievement. Students progress at their own pace, with behavior shaped towards the final goal through modeling, programmed instruction in small steps with immediate reinforcement, and selective reinforcement of correct behaviors (Grassian and Kaplowitz, 2001).

Constructivist learning theory posits that we construct our understanding of the world through reflection on our experiences. We create personal "rules" and "mental models" to interpret these experiences. Learning involves adjusting these mental models to incorporate new experiences (Schunk, 2008).

Cognitive learning theory focuses on strategies that help students monitor and direct their own learning, such as predicting outcomes, planning, time management, decision-making, and using alternative strategies. It views learning as the acquisition or reorganization of cognitive structures for processing and storing information (Donovan et al., 1999; Good and Brophy, 1990).

Klara Skubic Ermenc et al. (2015) studied the views of university teachers from Ljubljana and Belgrade on the relationship between pedagogical theory and practice, and the competence-based approach in pedagogy. Interviews with eleven professors revealed that most see pedagogy as primarily theoretical, emphasizing the importance of mastering theory for developing pedagogical competencies. They were generally critical of the competence-based approach and practical skills development. Despite some differences between the universities, similar views prevailed, highlighting a significant gap and dissatisfaction between modern pedagogical theory and practice, and indicating a need for reconceptualization.

Dr. Radhika Kapur's (2020) study on "Theories of Pedagogy" aimed to understand the concept of pedagogy and its importance for instructors. The study emphasized the need for educators to enhance their knowledge about educational goals, teaching methods, materials, student needs, and the overall education system. The findings concluded that when educators acquire a thorough understanding of pedagogical theories, they can perform their tasks more effectively, promote student learning, and improve the education system.

8.0 Need to Assess Pedagogical Competencies:

Assessing pedagogical competencies is crucial for improving classroom learning quality. It benefits both teachers and students by indicating teaching effectiveness and learning progress. Assessment helps teachers become organized, responsive, and aware of students' learning processes, enabling them to adjust instruction as needed. A competent academic teacher demonstrates a holistic understanding of teaching and learning, reflecting on and integrating theoretical knowledge with practical pedagogy. This reflective and scholarly approach is key to enhancing pedagogical practice (NCF, Maldives; 2014).

9.0 Review of Related Literature:

The review of related literature provides an understanding of the research methodology which lays the path to the researcher of how the study is to be conducted. It aids the researcher to become aware of the tools and instruments that proved to be useful and promising in the previous studies and also gives an insight into the statistical procedures and applications for establishing the validity of results. (Koul, L., 2019)

9.1 Studies related to Pedagogical Competencies

F A Ningtiyas and Jailani (2018) designed a study ‘Does Teacher’s Training Affect the Pedagogical Competence of Mathematics Teachers?’ to examine the effect of training attended by mathematics teachers on their pedagogical competence, knowledge and skill. The test data revealed that training contributed negatively to the knowledge aspect. While the questionnaire data revealed that the training followed by them contributed positively to the skill aspect, meaning, training has a positive effect on the pedagogical skills of mathematics teachers.

Chandan Kumar Sahana's (2018) study on "Pedagogical Competence: Quality Education For Future" explores factors influencing the development of pedagogical competence, which encompasses teachers' performance, knowledge, and skills in managing the teaching and learning process. This includes curriculum planning, lesson development, dialogic teaching, evaluation, and student development. Indonesian policies define pedagogical competence as understanding basic education, curriculum development, lesson planning, and reflective teaching.

Putu Eka Suarmika (2018) conducted a study on ‘Teacher Pedagogic Competency and National Examination Result at Elementary School’ to determine the relationship of teacher pedagogic competence to the national science exam results in elementary schools in the district Gerokgak, using ex post facto research method and analyzed the data using correlation analysis. Pedagogical competence is primarily concerned with the level of understanding of learners, instructional design, and implementation of learning the diagnosis, evaluation of learning. Results indicated that the pedagogical competence of teachers contributes to as much as 22.09% to the national science exam results.

Asuru and 2IKPA (2020) conducted a causal-comparative study to assess the relationship between teachers' pedagogical competencies and the academic performance of senior secondary

students in Rivers State. Using a sample of 382 out of 66,164 students, data was collected via a structured questionnaire with a reliability index of 0.71. The study found that teacher-centered, learner-centered, content-focused, and interactive/participatory teaching methods were commonly used. Basic instructional resources were generally adequate, and effective teaching skills were linked to creating a supportive learning environment.

Adegbola's study investigated how teachers' pedagogical competence affects students' attitudes toward Basic Science in South-West Nigeria. The study involved 2,160 students and 324 Basic Science teachers from 108 secondary schools. Data were collected using two questionnaires: the "Basic Science Teachers' Pedagogical Competence Questionnaire" (BSPCQ) and the "Students' Attitudinal Questionnaire" (SAQ). The findings showed that teachers' pedagogical competence significantly impacts students' attitudes. The study recommended focusing on teacher qualifications, using diverse teaching methods, and organizing professional development workshops to improve teaching effectiveness and positively influence students' attitudes toward Basic Science.

Jacobson Barineka Nbina (2012) examined the impact of teachers' competence on students' academic performance in Chemistry at senior secondary schools in Tai Local Government Area of Rivers State. The study, which involved 200 students, 20 teachers, and 6 principals, used a survey design with instruments including the Teachers Competence Questionnaire (TCQ) and the Chemistry Achievement Test (CAT). Analysis using Pearson Product Moment Correlation (PPMC) and t-test revealed a significant relationship between teachers' competence and students' performance. Students taught by qualified and experienced teachers performed better than those taught by unqualified and inexperienced teachers. The study recommended enhancing the development of science teachers in Nigeria.

9.2 Studies related to Teaching Competencies at the School Level

Ahmad & Khan (2016) investigated the teaching competency of secondary school teachers, examining the effects of educational qualifications, stream, and type of school. The study, involving 447 teachers, found that government school teachers outperformed private school teachers in terms of teaching competency. It also revealed that undergraduate (UG) and postgraduate (PG) qualifications did not significantly impact teaching competency, and science teachers demonstrated higher competency compared to art teachers.

Roxas (2015) examined the teaching competencies of mathematics professors in higher education institutions in the Province of Capiz. The study, involving 372 students, 82 mathematics professors, and 70 supervisors, found that classroom and teaching-learning conditions were rated as "adequate" by the respondents, with most of the

teachers being from private schools.

Moynihan et al. (2015) conducted a qualitative Delphi study on teacher competencies in health education with a sample of 26 experts. They identified 33 competencies and ranked their importance.

Kartik and Ahuja (2016) conducted a comparative study of teaching competency between male and female B.T.C. teacher trainees using the General Teaching Competency Scale. The study found that male trainees outperformed female trainees in post-instructional skills.

Choudhury and Chowdhury (2015) discovered a significant relationship between teaching competency and metacognitive awareness in their study on secondary teacher educators.

Kaur (2017) found a significant difference in teacher efficacy between urban and rural secondary school teachers, with 200 teachers participating in the study.

10.0 Significance of the Study

The study emphasizes that both content mastery and pedagogical competence are essential for effective teaching. Content mastery involves knowing what to teach, while pedagogical competence focuses on how to teach it. Effective pedagogy enhances student achievement and teacher confidence, improving the quality of education. Secondary school teachers, dealing with self-directed adolescent learners, must develop strong pedagogical skills to meet students' needs and prepare them for the future. Despite past educational reforms aiming to improve teacher competencies, gaps remain in pedagogical practices, often resulting in rote learning. Identifying and addressing these gaps is crucial for achieving quality teaching and learning.

A competent teacher requires both content mastery and pedagogical competency. Content mastery involves knowing what to teach, while pedagogical competency focuses on how to teach effectively. Effective pedagogy enhances student achievement and teacher confidence, contributing to quality education. Secondary school teachers must understand adolescent learning, as these learners are autonomous, self-directed, and responsive to problem-solving and task-oriented approaches. Despite past efforts and policies aimed at improving pedagogical competencies, issues like rote learning persist, indicating a gap in effective teaching practices. There is a need to assess and address these pedagogical problems to improve teaching and learning quality.

11.0 Statement of the Problem

Teaching is challenging and crucial for engaging students effectively. The quality of education depends significantly on how teachers plan, assess, and implement instructional strategies. Effective teaching focuses on student learning outcomes rather than just classroom activities. Assessing secondary school teachers' pedagogical competencies is essential for ensuring quality teaching. Based on literature review, the researcher has identified gaps in existing studies, leading to the proposed study titled: "Assessment of Teachers' Pedagogical Competencies in Secondary Schools and Developing a Pedagogical Model."

12.0 Definitions of Key Terms

Competency- "Competency is the proven ability to produce results. It is the result of intelligent effort. That knowledge, skills, and behaviors required of a teacher to bring about desirable behavioral changes among learners" (Passi, 1976).

Pedagogical Competency: Pedagogical competency is the teacher's ability to support the students' learning and the will to regularly apply the attitude, the knowledge, and the skills to promote learning in the best possible way. (Olsson & Roxå 2013)

Assessment of Pedagogical Competency: Assessment involves a series of measures used to evaluate a complex attribute of individuals or groups. In the context of pedagogical competency, it encompasses various methods and techniques. These include formal and informal observations of teacher performance, demonstrations of teaching skills and knowledge, as well as the planning and delivery of classroom instruction. (Brown, 1990)

13.0 Objectives of the study

1. To evaluate the pedagogical competencies of secondary school teachers in relation to various demographic factors.
2. To identify the pedagogical challenges faced at the secondary level.
3. To recommend effective pedagogical practices to address these challenges.
4. To create a pedagogical model tailored for secondary school teachers.

14.0 Research Questions

Following are the research questions for this study:

1. What is the extent of teachers' pedagogical competencies across different dimensions?
2. What are the pedagogical challenges faced by secondary school teachers concerning various demographic variables?
3. How do current pedagogical practices among teachers differ based on their demographic characteristics?
4. In what ways does pedagogical competence among secondary school teachers influence students' learning behaviors?
5. What factors are essential in developing an optimal pedagogical model for secondary school teachers?

15.0 Hypotheses

Secondary school Teachers do not differ in their level of pedagogical competencies.

1. There will be no significant difference between Private and Government secondary school teachers in their pedagogical competencies.
2. There will be no significant difference between male and female teachers in their pedagogical competencies
3. There will be no significant difference among different subject teachers in their pedagogical competencies.
4. There will be no significant difference among different teaching experienced teachers in their pedagogical competencies.

16.0 Research Methodology

16.1 Research Design:

A research design is a structured plan that guides the researcher through the study. This research aims to evaluate secondary school teachers' pedagogical competencies, identify pedagogical issues, and develop a

pedagogical model. To achieve these objectives, a mixed research design will be employed, which combines both quantitative and qualitative data collection and analysis methods (Creswell, 2014). The study will be conducted in three phases: Phase I (Quantitative) will assess the level of teachers' pedagogical competencies; Phase II (Qualitative) will explore the pedagogical challenges faced by teachers; and Phase III (Qualitative) will focus on developing an optimal pedagogical framework for secondary school teachers.

Table-1: Research Design

Type of research design	Research Tools	Variables	Population and sample	Statistical techniques
Mixed Research Design: Quantitative Method (Survey) Qualitative Methods (interview, FGD).	1. Teachers' Pedagogical Competence tool 2. Interview schedule for administrators 3. Focus Group Discussions for teachers	Pedagogical Competencies is taken as dependant variable Demographic variables- 1. School Management 2. Teachers' gender 3. Teaching Experience 4. Teaching Subject	Teachers and Administrators working in secondary schools in Delhi Stratified random sample of 1000 secondary school educators and 200 administrators will be selected for this research	Quantitative Data Analysis: Mean, SD. Graphical representation of the data 't' test and ANOVA Qualitative data analysis

16.2 Population and Sample of the study:

The population for this study includes all secondary school teachers in both government and private schools in Delhi, encompassing both male and female teachers with varying levels of experience and teaching subjects.

Multistage stratified sampling technique will be used in which a sample is drawn from a population using smaller and smaller groups (units) at each stage for obtaining the final sample from the population. In the first stage, random selection of proportionate government and private schools from four districts out of nine districts within Delhi will be included. At the second stage, 25 government schools and 25 private schools will be selected from each of the four districts using a simple random method. In total, there will be 200 schools selected for the study. One school administrator each from the selected 200 schools will be involved in the study to identify the pedagogical problems at school level. In the third stage, five subject teachers, teaching language, mathematics, science, social science and co-curricular subjects will be selected randomly from each school. A total sample of 1000 teachers and 200 administrators, including male and female teachers, in different teaching subjects with different teaching experience will constitute the sample for my study.

Table 2: Teachers Sample to be selected for the study

District	**Sample-Schools**	**Sample-teachers**	**Sample-Administrators**
District-I	50 schools (25 government+25 private)	250 teachers (125 government +125 private)	50 Administrators (from 50 schools)
District-II	50 schools	250 teachers	50 Administrators

	(25 government+25 private)	(125 government +125 private)	(from 50 schools)
District-III	50 schools (25 government+25 private)	250 teachers (125 government +125 private)	50 Administrators (from 50 schools)
District-IV	50 schools (25 government+25 private)	250 teachers (125 government +125 private)	50 Administrators (from 50 schools)
Total	200 schools	1000 teachers	200 Administrators

16.3 Variables in the Study:

A variable is a measurable or observable characteristic or attribute that can vary among individuals or organizations being studied. Commonly measured variables in research include gender, age, socioeconomic status (SES), and attitudes or behaviors such as racism, social control, political power, or leadership (Creswell, 2014). The variables examined in this study are:

Dependent Variable

Dependent Variables are the behaviors of participants that can be measured. They are dependent because they 'depend on' what the participants do. In this study "Teachers' Pedagogical competency" is the dependent variable.

Demographic Variables

Demographic variables are characteristics of a population that are studied statistically and are considered independent variables since they cannot be manipulated. In this study, the demographic variables include school management, teaching subject, gender, and teaching experience.

16.4 Development of the Tools

The current research study will use the following tools which will be developed and standardised by the investigator:

(a) Pedagogical Competence Scale (PCS) for teachers,

(b) Semi-structured interview schedule for administrators,

(c) Focus Group Discussion (FGD) for teachers

Tool Validation: To ensure the reliability and content validity of the research tools, they will be reviewed by experts in the field and a psychometric specialist. This process will address any ambiguities and language issues. Expert validation will be conducted to establish both content validity and reliability of the research tools (Cohen, Manion, & Morrison, 2013).

15.5 Analysis of the data: Both quantitative and qualitative analysis techniques will be used to interpret the data obtained. Statistical techniques like descriptive, parametric, non-parametric tests, factor analysis will be used.

16.0 Ethical considerations: In the present research, participants will be required to share their personal information experiences and choices with the researcher for which their informed consent will be taken in writing and confidentiality will be ensured to them.

17.0 Delimitations of the study: The study is confined to Delhi only. Selected demographic variables will be considered for the study. Selected dimensions only will be considered to measure the teachers' pedagogical competencies.

18.0 Contribution to the Discipline: The current study will contribute to the education, pedagogy, school education, measurement in education at (a) Conceptual level, (b) Methodical level, and (c) Practical level. On the conceptual level, a comprehensive view of teachers' pedagogical problems is intended to be offered through this study. The study will also offer an understanding of teachers' pedagogical competencies in shaping the nature of students' learning and teaching effectively. On the methodical level, the present study will explore attitudes and practices among teachers on different pedagogical practices. On the practical level, the study intends to offer meaningful and practical suggestions for teachers, school administrators as well

as policymakers for pedagogical practice in secondary schools with respect to selected variables. Exploring the pedagogical competencies among teachers' will help school authorities to understand at a deeper and meaningful level and hence, taking steps to design curriculum frameworks, teachers' preparation for imparting social values. Thus my study 'Assessment of Teachers' Pedagogical Competencies in Secondary Schools and developing a Pedagogical Model' will contribute in improving the quality of teaching, and thriving into a good teacher in the present and future.

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